Dolly Varden and coho salmon were verified above the falls and rearing steelhead below the falls with minnow traps. There are numerous side channels and undercut banks which provide good rearing habitat.

The banks are open, with some blueberry present, thus providing easy access up the stream for fishing. Due to the easy access and good pool-riffle combination, this system has a very good potential to develop into a sport fishing area. However, due to the close proximity of the Honker Divide-Thorne River area with its exceptional sport fishing and recreational opportunities and the fact that large recreational leaves will be recommended for that area, it is felt that additional large recreational leave areas along the streams within this unit are unnecessary.

Recommendations:

All recommendations made concerning the east fork would also apply to this stream.

GENERAL COMMENTS:

Again as with the Naukati unit, we have a sale unit adjacent to a high priority recreational area, namely the Honker Divide - Thorne River area. Consequently the main emphasis on the recommendations concerning this unit was not only to protect the streams within the unit, but also the visual and aesthetic impact to the surrounding recreational area. The deferred areas which are recommended should be correlated with the soils and landscape reports for possible alterations.

cc Rade
Novak
Palmes
Wadman

Bishop

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

R-10

REPLY TO: 2520 Watershed Protection and Management

June 27, 1972

SUBJECT: North Thorne River Drainage

TO: Forest Supervisor, South Tongass N.F.

The attached report by Bishop should form a part of the preparations for planning in the North Thorne River drainage.

Joseph Zylinski

JOSEPH ZYLINSKI
Chief, Branch of MU and Watershed

Enclosure

DBishop:mt

NORTH THORNE RIVER DRAINAGE

Description

The North Thorne River drainage above Snakey Lakes is dominated by uniformly steep, frequently rocky slopes in a glacial U-form valley with much thick glacial till. The valley bottom maintains a surprisingly low gradient, probably because of vertical bedrock controls in the valley and the rapid weathering characteristic of the bedrock, which produces large volumes of rather small angular and platy streambed materials. In the 1/2 to 3/4 mile section below the upper falls in the west fork, the gradient is consistently less than 1% and appears more like .5% in most places. Further downstream the gradient decreases, except at the lower falls.

Landslide tracks both recent and vegetated are common on the valley walls. Surprisingly little alder shows on these areas. The lack of spruce strips on landslide tracks is also evident. Hemlock-cedar stands dominate many slopes.

Fan deposits occur below larger V-notches and some of these support spruce stands. The alluvial soils along the west fork in the mile below the upper falls supports an open grown spruce-hemlock strip that is subject to flooding during high waters.

I saw only two small blowdown patches in the drainage.

Bedrock shows along the banks of the west fork for about 3/4 mile below the upper falls. The streambed in this section and on downstream about another mile contains good-looking spawning riffles. Gravel is angular to platy, generally less than 2-inches in diameter.

Streamflow

At the time of visit, streamflow was high enough so that samples for water chemistry were not practical. I did check conductivity of several surface waters. Values were fairly low -- all less than 50 micromhos. Color of water above the upper falls of the two streams did not suggest the relatively high tannin-lignin levels one might expect from this valley, interspersed as it is with muskegs.

Muskegs in the valley bottom impressed me as favoring a sedge type, rather than sphagnum. If true, this suggests muskegs, at least along the edges of the valley, that are shallower in depth and have better drainage than sphagnum types. It is possible that some muskegs, particularly those located near the mouths of V-notches, may be formed on water-bearing aquifers (gravels) where the water is trapped by structure or deposits lying just downstream. The entire valley bottom maintains a notably high water table.

The upper falls in the west fork drop about 25 feet in 75 feet. Judging from the appearance of the flows at the time we visited the falls, it looked like most salmonids would have difficulty negotiating them. I believe resting pools could be blown at two or three places on these falls (rapids?).

Temperatures

No attempt was made to measure water temperatures in North Thorne River. The characteristics of North Thorne River drainages (see tabular description below) indicates that the upper drainages yield fairly cool water, not exceeding 60° F. In contrast, water temperature at the mouth of the North Fork will reach considerably higher levels -- I suspect as high as 70° F. These higher temperatures may act to keep pink/chum salmon out of the North Fork during their normal spawning period.

Characteristic	Upper West Fork	Upper East Fork	Lower Drainage only	Total Drainage
Total area (acres)	7,620 (11.9 sq. mi.)	5,860 (9.15 sq. mi.)	7,620 (11.9 sq. mi.)	21,000 (32.95)
Area above 1500'				
(a) acres	2890	2240	550	5,680
(b) %	38%	38%	7.2%	27%
Lake area				
(a) acres	0	10	490	500
(b) %	--	--	6.4%	2.4%
Elongation ratio	2.59 (max. drain. line=5.1mi.)	2.34 (max. drain. line=4.0mi.)		4.01 (max. drain. line=13.0)
Aspect	SSE	SSW	S	
Regression-produced maximum temps. *	(61°F.)	(60.3°F.)		(68.4°F.)

* from work by Bishop (1968)

Non-Lake Stream
(1968 max. base)= -24.8
+.00005(acres in watershed)
-.143(%area 1500'+)
+2.09(elongation ratio)
+1.55(May-Sept. average air temp.)
Thorne Bay=55°

Lake Stream = -42.3
-.00004(acres in watershed)
+.1(% watershed area 1500'+)
+2.09(elongation ratio)
+1.1(% lake area)
+1.72(May-Sept. average temp.)

Neither of the branches of this drainage should experience particularly low low-flows. There is much evidence of reserve storage capacity in the watershed. I would guess these two upper drainages have a low flow yield of about .6 cubic ft./sq.mi.drain.area(cfsm) meaning the west fork would reach a minimum of about 7cfs and the east fork about 5½cfs.

Peak flow estimates, if generated by available formulas should be comparable to measured values for Harris River or Maybeso Creek. This requires that the estimator evaluate peak flow records for these two streams (Harris River and Maybeso River) to determine the approximate recurrence interval of measured peak cfsm's of 307 and 249 respectively over the periods of record (about 14 years).

Many low gradient portions of the stream system will be subject to flooding. Stream sections with rock control or rock in the stream banks can be defined on the photos.

Recommendations

1. Special logging back lines should be established:

a. Where the stream comes near to landslide prone slopes -- notably along a significant part of the west fork's east wall -- logged slopes should not exceed slopes of 30 degrees. Logging should extend to the stream along this stretch (except near the falls), and all skidding should be away from the stream. This margin of timber provides no shade.

b. Where skyline or balloon system allows a long reach, care should be taken not to break through a buffer between the commercial timber stand and the more open sub-alpine timber types.

Such openings could allow snow avalanches to more-or-less permanently dominate the slopes below, preventing regeneration. This condition is particularly true on the west wall of the west fork.

2. Judicious, planned use of alluvial fans for road-building material should be considered here, where operable rock may be in short supply. There are probably several such sites in the valley. These pits must not be located in the course of water flow. There should not be outward surface drainage from these sites. Pit walls should be dressed when the

pit is abandoned, and ground surfaces seeded or planted(grass - alder?). Where potential exists, ponds that result may be connected with a rearing fish system.

3. Fishery habitat would probably be improved by blowing resting pools into the upper falls of the west fork. Such an improvement will be directed primarily at getting more coho into the upper stream system. It should be listed among other potential improvements and considered for negotiating with KPC for accomplishment.

4. A leave strip or uncut block should be maintained:

a. near each falls for scenic purposes.

b. Between the upper falls of the west fork and the lower falls. This strip is narrow and adjoins muskeg or scrub timber. It presently protects the lower stream (which is wide and fairly shallow in this section) from heating by radiation.

c. In the upper parts (where significant parts of the V-notch slopes reach 30^{o}) of at least the two largest V-notches on the east side of the west fork. These V-notches, which are adjacent to one another, discharge near the mainstream and if they experience landslides/torrents, the product will enter the mainstream. The commercial stands on the discharge fans of these streams can be removed. Debris should not be left in flood channels.

5. A thermograph, or at least a series of hand thermometer measurements, should be maintained at the lower falls of the north fork, or if more convenient, just above the confluence of the north fork with Thorne River.

D.M. BISHOP
Hydrologist
USDA Forest Service
June 1972

June 1972

TIMBER REPORT ON THE NORTH THORNE RIVER PLANNING UNIT

The following comments and recommendations are submitted from Bob Burke and Dan Swaney, Foresters for the U. S. Forest Service. The recommendations are based on evaluating existing inventories on the North Thorne drainage with field checks on seven different days by helicopter during June 1972.

The area considered for this planning study includes those areas not already released for logging which begins at the end of the existing road and clearcut setting and extends to the head of the North Thorne drainage. This area includes approximately 17,000 acres of which approximately 6,900 acres are of commercial timber type.

The commercial forest stands are primarily limited to the side-slopes from the 400-foot contour up to the 1800- or 2000-foot contour. The general stand condition class for the entire area would be rated No. 4. Blowdown patches of an acre or less are common on all slopes.

Western helmock is the major species with red and yellow cedars on nearly all sites. Sitka spruce is limited to the well-drained landslide fans. Mountain hemlock was found to be the major species above the 1500-foot contour.

Existing Ketchikan Pulp Company highlead and slackline equipment was assumed to be the logging equipment available for this entry.

Road access for timber harvest is limited to the valley floor. The amount of roads constructed for highlead logging would be the same required by balloon or skyline logging systems.

Road construction for logging purposes across the valley floor between Snakey Lakes and the first major fork above the lakes was looked at in this study. The main reason was for timber access into the main Thorne River valley at a later date. This road alternative would require an additional 44 stations that would otherwise not be constructed but would reduce the average haul distance for 51 MMBF of timber in North Thorne. This would create a rough savings in haul cost of $38,000 in North Thorne and add approximately $88,000 in road cost. So roughly, 40 MMBF of timber would have to come from the main Thorne River Drainage to justify this alternative for timber purposes.

Total road construction required to log North Thorne River Planning Unit would be approximately 19 miles.

A conceptual layout of North Thorne utilizing highlead and slackline systems indicate that 4261 acres can be logged or 104.4 MMBF. This is of a total 6887 acres of presently commercial forest land or approximately 210 MMBF.

We estimated that 1500 acres of commercial forest land are on slopes greater than 90 percent, and these slopes were considered [illegible] economically as well as physically impossible to log with present logging technology. Total volume on these slopes is estimated to be 38 MMBF.

With the steep slopes removed from the presently commercial forest land within the unit, 6D percent can be highlead and slackline logged. The remaining 39 percent would lie above the backlines up to the alpine zones.

A SMALL FLAT AT THE HEAD END OF [illegible] FORK [illegible] THORNE IS HEAVY TO UNDERBRUSH [illegible] AND BEDLOAD MOVEMENT. REGENERATION [illegible] A PROBLEM AFTER LOGGING. THE SOIL IS HIGHLY PRODUCTIVE ON [illegible].

Recommendations

1. Allow highlead and slackline logging with colddecks within this planning unit where no commercial timber is left above the backline.
    a. Stand condition class warrants timber harvest now rather than deferring for a more efficient logging system later on in time.
    b. This would have less impact on the landslide prone slopes because less area would be disturbed.

2. Defer or remove from commercial forest inventory those areas that exceed 90 percent slope.
    a. Allow highlead and slackline logging the front of these steep areas as long as considerable timber is not left between the backline and the steep slopes.

3. Defer logical skyline or balloon system settings where highlead or slackline systems cannot reach all the commercial timber. and insufficient knowledge in [illegible] [illegible] of logging the site [illegible]

4. Determine whether we will want road access into Thorne Lakes from the North Thorne System before the crossing is allowed on the upper end of the west fork of North Thorne River.

[illegible]

5. Soil ~~treatment of~~ all landslides in this area the season following their occurrance.

6. PLANT THE SMALL FLAT ON THE NORTH FORK [illegible] DINGS AFTER LOGGING TAKES PLACE

Alternatives for Logging

1. Defer the entire drainage until Ketchikan Pulp Company has the capability to log all commercial timber.
   a. The 68 MMBF could help support possible higher logging costs or investments on a later entry.
   b. The logging impact would be much greater if we log all the commercial timber at once.

2. Log all highlead loggable timber this entry.
   a. This may have less impact on the land than alternative No. 1.
   b. The timber behind the backline would become noncommercial for considerable time into the future.

Timber Consequences of Recommendations

1. Approximately 2120 acres of commercial forest can be harvested or 68 MMBF.

2. Logical settings deferred for balloon or skyline systems would amount to approximately 3250 acres or 104 MMBF.

   a. Of this area 36.5 MMBF of timber could be highlead or slackline logged now.

3. Approximately 38 MMBF of timber would be deferred or removed from harvest because of slopes exceeding 90 percent.

4. Approximately 16 miles of road would be required to log this entry.

NOTE: Conceptual layout delineated on the overlay map should be recognized as conceptual with field check. Minor changes in the field layout are certainly possible, but should be checked against the recommendations of this report.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
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REPLY TO: 1310 Planning

June 21, 1972

SUBJECT: North Thorne River Drainage

TO: Forest Service Planning Office, S. Tongass National Forest

On June 13-14, 1972, I accompanied Charlie Gass, South Tongass Soil Scientist, on a preiminary field investigation of the relative stability of the slopes the North Thorne River area.

Glaciation has strongly modified these slopes, resulting in extremely steep slope gradients (ranging from 40 degrees to 60 degrees on the upper slopes), smoothed and differentially eroded bedrock surfaces and youthfull, shallow, coarse-grained soils derived primarily from local bedrock by mass wasting processes (gravity, freeze and thaw). Landsliding is the dominent natural erosion process in the area and there is much evidence of past and present erosion activity of this type.

Bedrock in areas of major debris avalanching consists of interbedded black slate, graywacke and andesite. This is the dominant bedrock on the slopes of the ridge between North Thorne River and its eastern tributary and the west facing slope of the eastern tributary. The bedrock strikes more or less parallel to the slope and dips into the slope at a shallow angle. Differential erosion along these beds has produced a series of bluffs and benches on the slope providing locally very steep slopes from which most of the debris avalanches have originated.

A major joint surface is developed and overprints the basic geologic structure, producing zones of weakness in the rock parallel to the slope. These joints provide zones of reduced friction on the slope; areas of concentrated water movement and potential development of hydrostatic pressure within joints; and excellent sliding or failure surfaces for the surface soils.

Bedrock in the ridge west of the North Thorne River is composed predominently of massive andesite, jointed essentially horizontal and vertical and breaking out in large, blocky units. The slopes, which are exceptionally steep, are broken repeatedly by vertical cliffs. Soils are shallow or absent and the cliffs tend to break the slope into small sections which reduce the probability of massive debris avalanche development. Rock falls and rock slides are common on this slope due to frost wedging, but are limited in size and usually stabalize a short distance downslope. Few landslides were observed on this slope, although numerous localized slumps were.

Excess soil water is a major contributing factor in the initiation of debris avalanches in the North Thorne River Unit. The ridge tops above the most active landslide slopes are broad and muskeg covered. During major storms, runoff is probably very high, most of the water being channeled directly into the slope soils. Thus, the probability of rapid soil saturation and development of active pore-water pressure on the slopes is high (pore-water pressure, is pressure between soil grains produced by a rising water table in the soil). Saturation greatly increased the weight of the soil mass and the force of gravity acting on the soil. Pore-water pressure reduces friction between soil grains and along the bedrock surface. All of the debris avalanches observed, were saturated at the head wall and were located in areas of obvious subsurface water concentration. During major storm periods, the effect of excess soil water is to greatly reduce the stability of an already unstable slope creating a condition requiring only a small triggering force to set the slope in motion. This could result from windthrow, rock fall or the rapid addition of surface load from a small landslide upslope. Windthrow was observed in widely scattered areas on these slopes and may have been an important triggering device in past debris avalanche development.

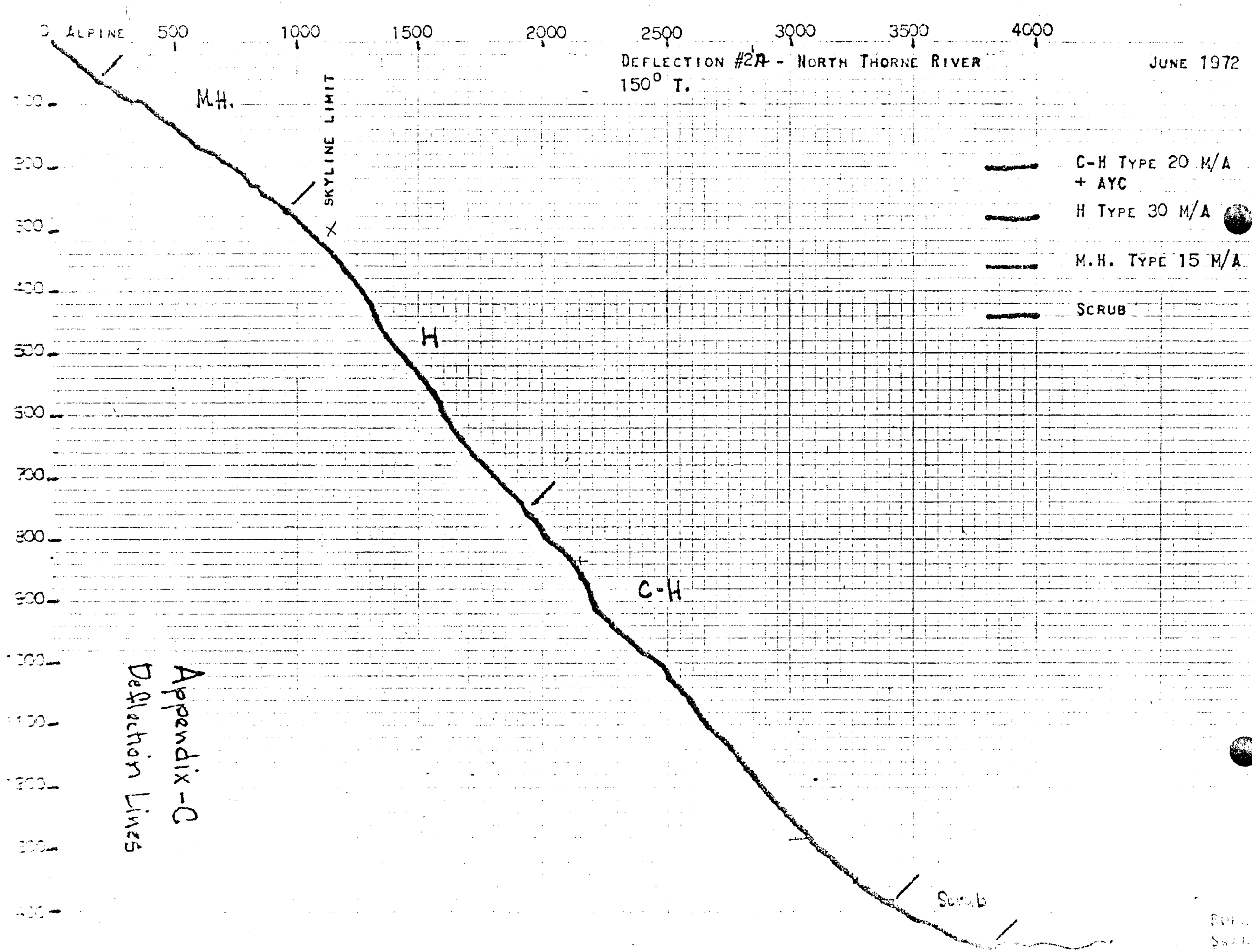
These slopes are highly unstable under the best of natural conditions and are particularly senstive to any activities or events which change the delicate balance of forces on the slope. Vegetation rooting is probably the major stabalizing influence in these naturally unstable areas and any activity which tends to destroy or alter this influence should be avoided.

Slope angle stands out as the prime factor in the instability of these slopes. Soils of the type found in the zones of debris avalanche initiation have an angle of stability (closely related to the angle of repose) ranging between 28 degrees and 37 degrees, far below the slope gradients measured in this zone (40° - 60°). To avoid substantial increases in the occurences of debris avalanches in this area, operations on all slopes above 37 degrees should be avoided. Slopes between 28 degrres and 37 degrees are questionable areas of operation and should be logged using methods which minimize surface disturbance. Even so, some debris avalanching can be expected.

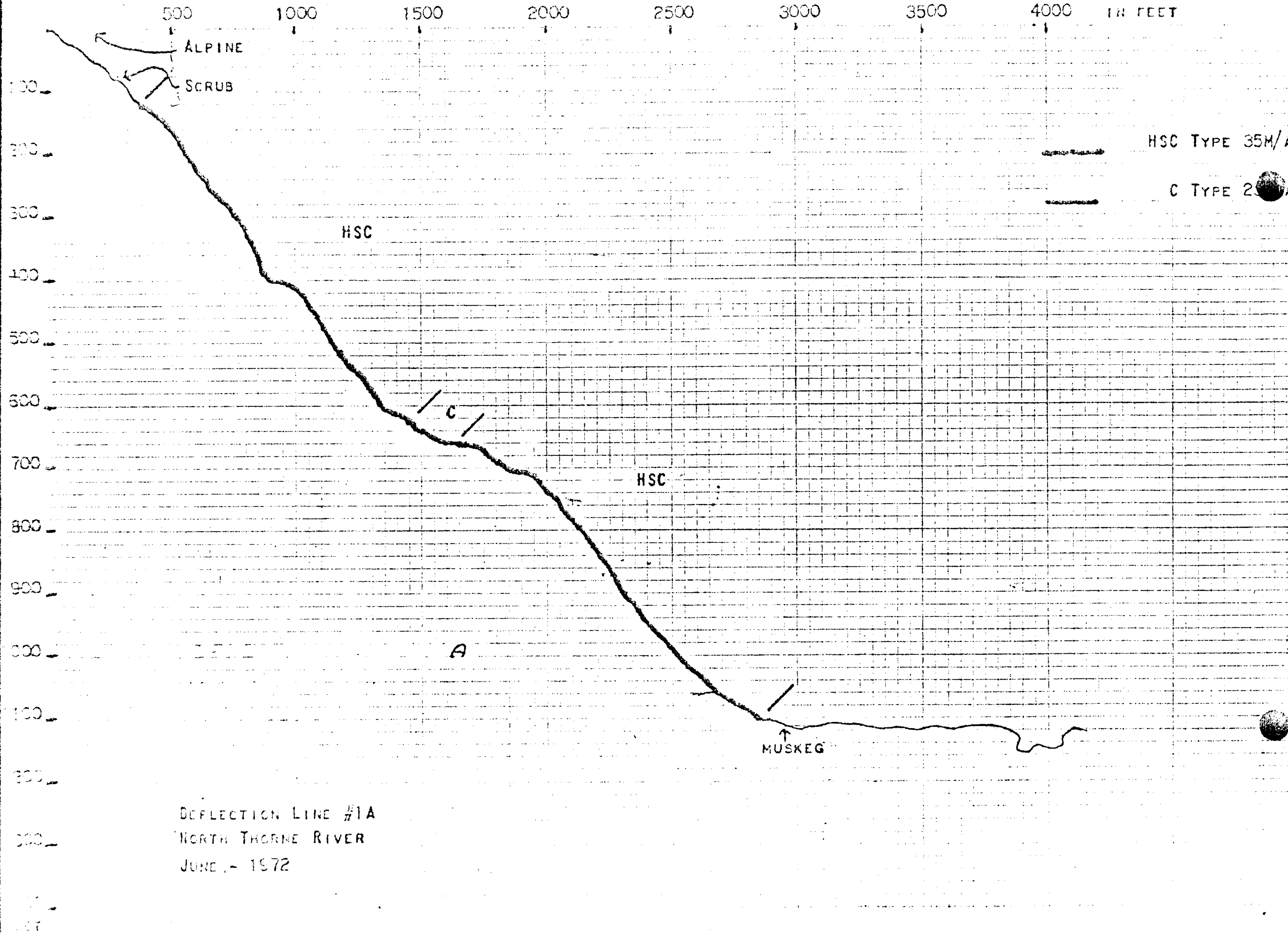
On slopes below 28 degrees, conventional logging can be performed with a minimum of landslide activity, however, on local bluff areas with oversteepened slopes, some sliding can be anticipated. Most of the debris avalanches occuring in this unit developed on extremely steep bluff faces high on the slope.

Douglas N. Swanston by Chuck R. Doss

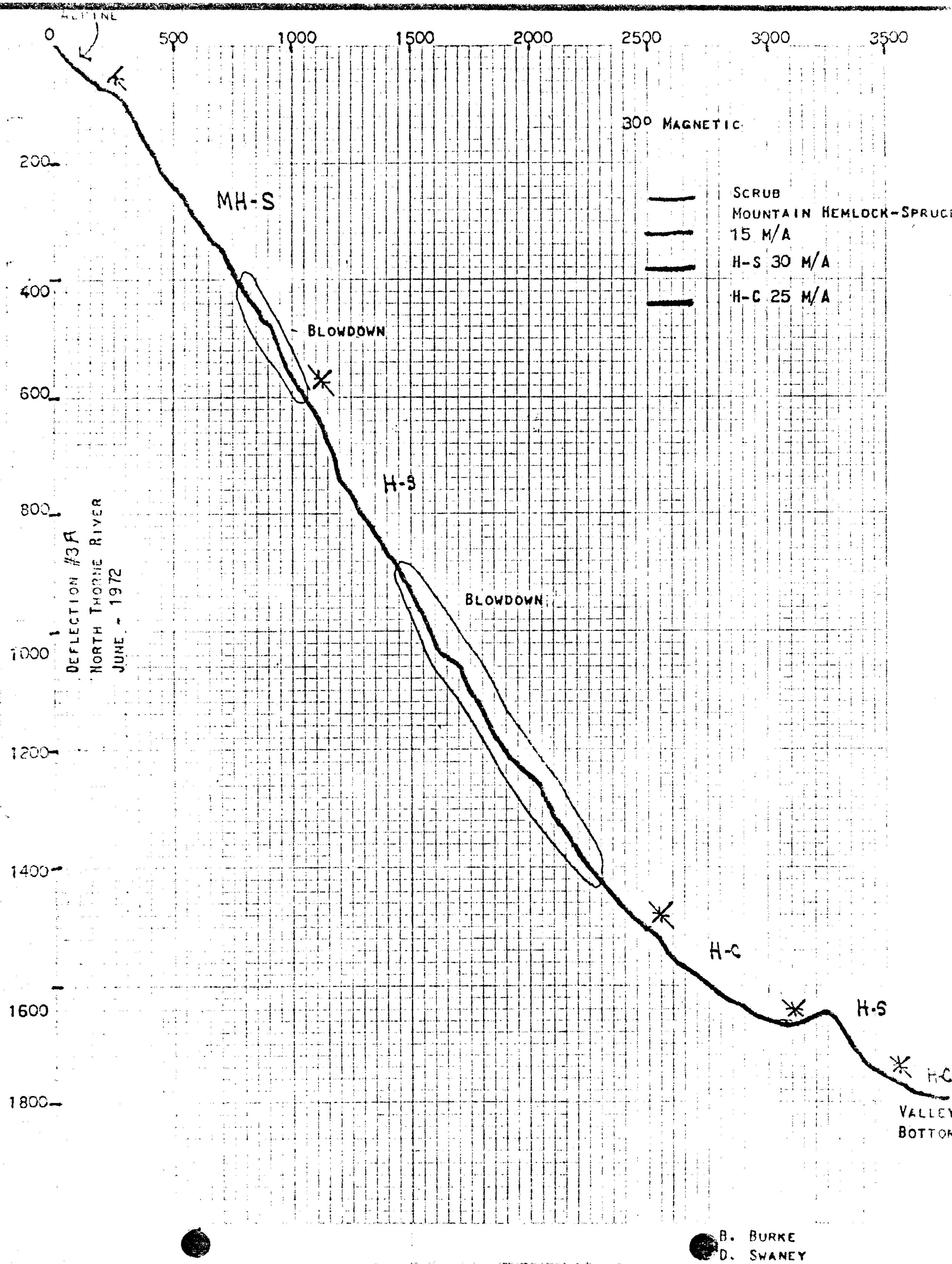
DOUGLAS N. SWANSTON



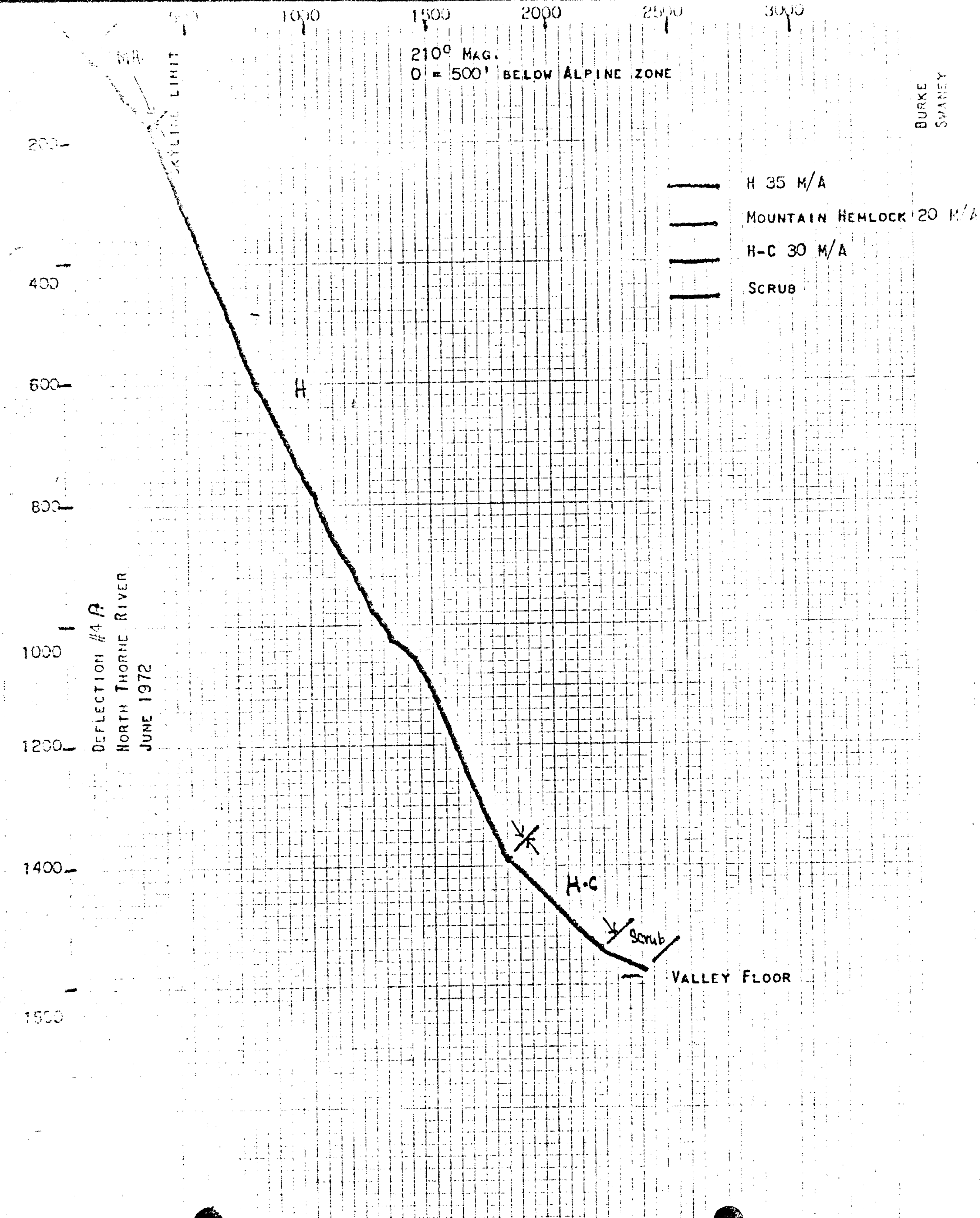
Appendix-C
Deflection Lines

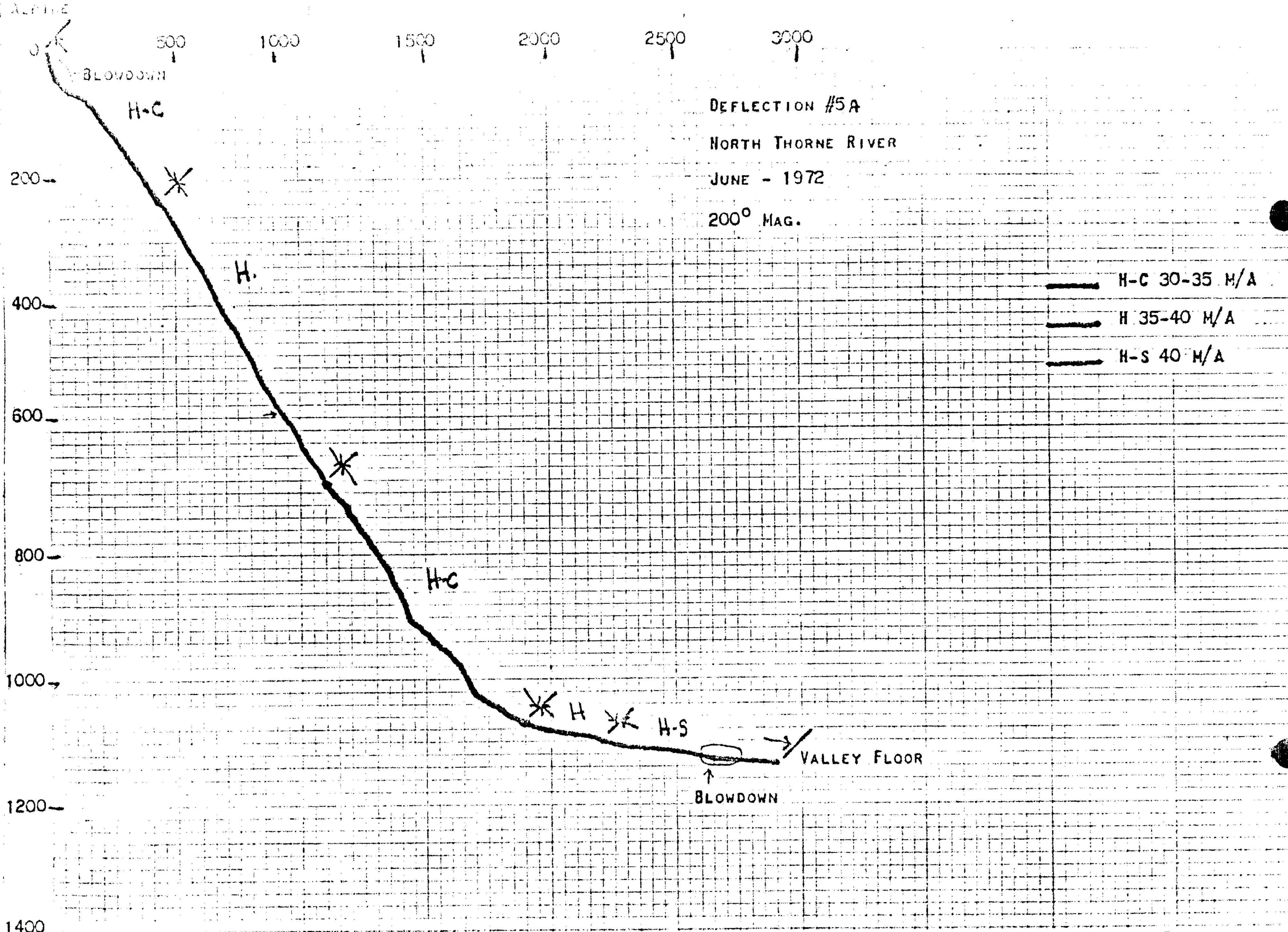


DEFLECTION LINE #1A
NORTH THORNE RIVER
JUNE - 1972

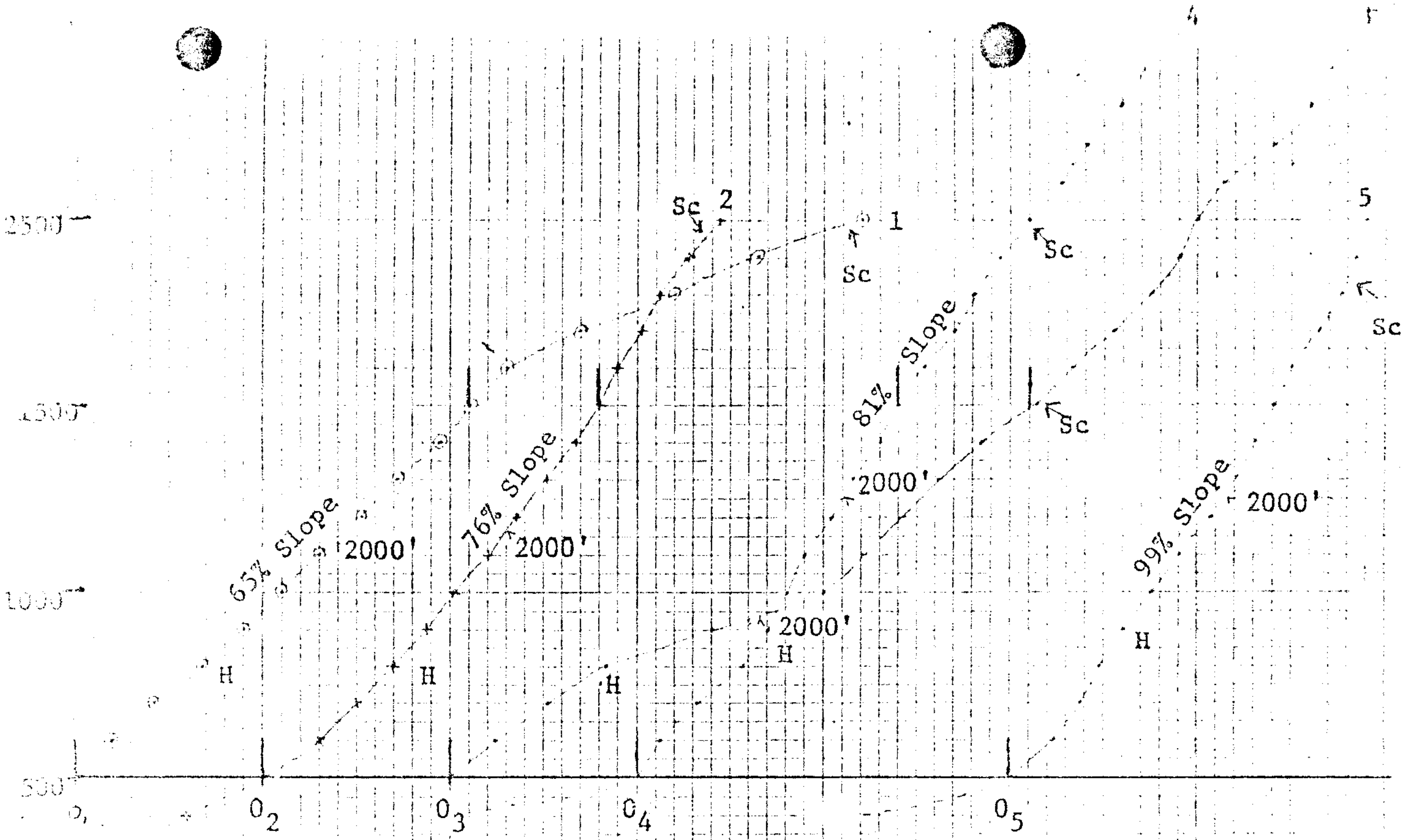


ALPINE
0
500
1000
1500
2000
2500
3000
3500
200
400
600
800
1000
1200
1400
1600
1800
30° MAGNETIC
SCRUB
MOUNTAIN HEMLOCK-SPRUCE
15 M/A
H-S 30 M/A
H-C 25 M/A
MH-S
BLOWDOWN
H-S
BLOWDOWN
H-C
H-S
H-C
VALLEY
BOTTOM
DEFLECTION #3A
NORTH THORNE RIVER
JUNE - 1972
B. BURKE
D. SWANEY


210° MAG.
0 = 500' BELOW ALPINE ZONE
BURKE
SWANEY
H 35 M/A
MOUNTAIN HEMLOCK 20 M/A
H-C 30 M/A
SCRUB
SKYLINE LIMIT
DEFLECTION #4 A
NORTH THORNE RIVER
JUNE 1972
H
H-C
Scrub
VALLEY FLOOR
1000
1500
2000
2500
3000
200
400
600
800
1000
1200
1400
1500



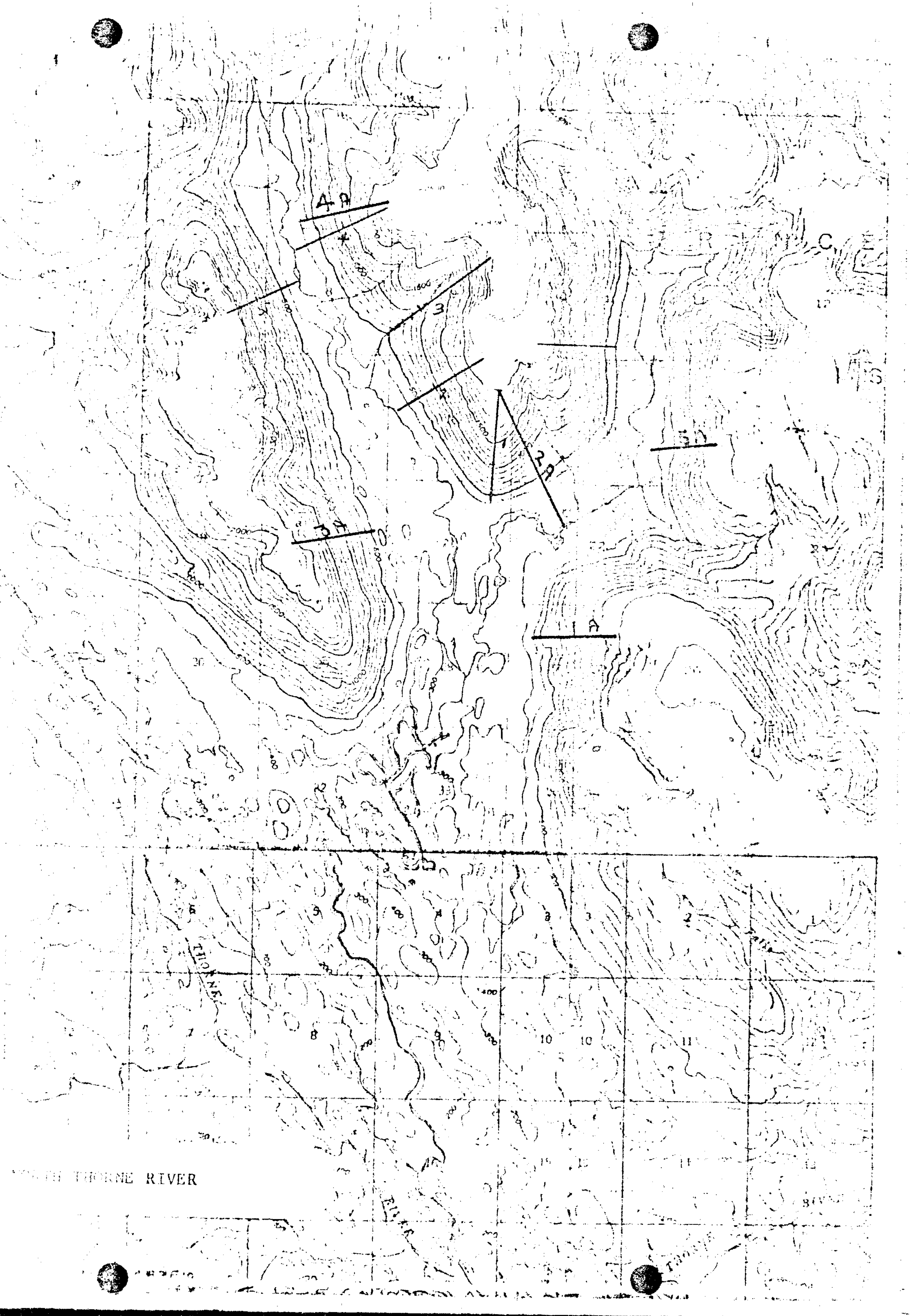
BURKE
SWANEY



Horizontal Distance 1" = 1068'
5" = 1 mile

North Thorne River Profiles

Ron Cox



... TH THORNE RIVER


STUDY AREA
Existing Rd.
Lake Galea
Thorne Lake
Baird Peak
CLARENCE
Cabins
Loon Creek
Falls Cr
Cabins
Cabin
THORNE BAY
Thorne Head
Tolstoi Pt
Thorne Bay
Angel Lake
Setter Lake
North Pole Hill
Salt Chuck Mine
Salt Chuck
Loon Lake
Rush Pk
Rush and Brown Mine
Paul Young Creek
Tolstoi Mtn
Cabin
Windfall Hbr
Jacobs Mtn
Alarm Mine
Poor Man Mine
Pt Adams
Kasaan
KASAAN
Kasaan Island
Berry
Cabin
Cabin
Anderson Creek
Salmon Lake
Mound Pt
Karta Bay
Little Salmon Lake
Sandy Pt
Black Lake
Black Bear Lake
McGilvery Creek
Granite Mtn
Flagstaff
Wolf Lake
Cabins
Lucky Nell Mine
Maybeso Creek
Puyallup Mine
Harris Peak
Hollis
Harris River
Twelvemile Arm
Coal Bay
Kina Cr
Old Franks Lake
Lake Mary
Smith Lagoon
Skowl Arm
Indian Cr
Klawak Lake
Big Salt Lake
Klawak
Klawock P.O.
Carlton I
Onslow Island
Eagle I
Ernest Pt
Meyers
Center I
Double I
Spit I
Macel Pt
Cabin
STOLIN
PRINCE OF WALES
North Thorne River Planning Unit